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ABSTRACT

An experiment employing a 2x2x3 factorial design sought to determine the extent to which socially disadvantaged elementary school students' unfamiliarity with some terms in a verbal subsection of a group intelligence test may account for their relatively poor performance on such tests. Training was provided so as to attempt improvement in these students' test performance. Fourth, fifth, and sixth grade disadvantaged children (288 in number) were randomly assigned within sex and classrooms either to a relevant or irrelevant familiarization condition. Four trials of pronouncing and writing 20 verbal items later encountered in context as part of a modified Subtest Number 7 of the California Short-Form Test of Mental Maturity comprised the familiarization process. Treatment differences involved different word lists. Immediately following this, students read the story part of the Subtest and answered the 25 multiple-choice questions. A spelling test on the 20 relevant terms followed. Analysis of variance of the data showed that although the "relevant familiarization" group was superior to the "irrelevant familiarization" group on the spelling test, there were no significant differences between the groups on Subtest 7. Further analysis disclosed that only a minority of the "relevant familiarization" group managed to finish the experimental treatment before being introduced to the story; results were, thus, held to be inconclusive. (Authors/JM)

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THE EFFECTS OF FAMILIARIZATION ON THE VERBAL INTELLIGENCE TEST PERFORMANCE OF SOCIALLY DISADVANTAGED YOUTHS

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SUMMARY

There is a growing corpus of research which indicates that an initial unfamiliarity with the terms encountered in a prose passage impedes learning. This experiment sought to determine the extent to which socially disadvantaged youths' unfamiliarity with some terms encountered in a verbal subsection of a group intelligence test may account for their relatively poor performance on such tests. Familiarization training was provided so as to attempt improvement in these students' test performance.

The experiment employed a 2 x 2 x 3 factorial design. Two hundred eighty-eight 4th, 5th, and 6th grade socially disadvantaged youngsters were randomly assigned within classrooms and sex either to a relevant or irrelevant familiarization treatment condition. Therefore, the experimental factors were: treatments (relevant or irrelevant familiarization), sex (male or female), and grade level (4th, 5th, and 6th). Familiarization consisted of four trials of pronouncing (three times per trial) and writing (once per trial) twenty verbal items later encountered in context as part of a modified Subtest No. 7 of the California Short-Form Test of Mental Maturity (CSFTMM). Treatment differences involved different word lists: the Relevant Familiarization (RF) group was exposed to twenty content words presumed to be initially unfamiliar to the students (words such as: fawn, dusk, sensitive, etc.), whereas the Irrelevant Familiarization group (IF) was exposed to twenty articles, prepositions, etc., thought to be initially familiar to the students. Immediately following the familiarization treatment (which required approximately ten minutes), the students read the story part of Subtest 7 of the CSFTMM and answered the twenty-five multiple-choice (with three distractors) questions. Following this test, a spelling test on the twenty relevant terms was administered (each term was presented accompanied by four misspelled distractors).

The data, analyzed by means of ANOVA, showed that although the RF group was superior to the IF group on the spelling test, there were no significant differences between the groups on Subtest 7 of the CSFTMM. Further analysis disclosed, however, that only a minority of the RF group managed to finish the experimental treatment before being introduced to the story. The results of the study were, therefore, judged to be inconclusive with respect to the hypothesis under investigation.

INTRODUCTION AND REVIEW OF RESEARCH

A substantial amount is known about the characteristics associated with learning disabilities in socially disadvantaged children (Review of Educational Research, 1965, 35, 373-442). Unfortunately, the data are usually reported as correlations which, because they do not identify the causes of disability, do not establish the course remediation should take (Gordon, 1965, p. 385). We must depend upon experimental research to discover the causes of learning disability in this population and, thereby, to suggest the remedial procedures by which a disability can be reduced or eliminated.

In undertaking such a venture, perhaps we should take our lead from the remarks of Jerome Bruner, who, in his Presidential Address to the Society for the Psychological Study of Social Issues (1965), stated: ". . . the idea of 'readiness' is a mischievous half-truth. It is a half-truth largely because it turns out that one teaches readiness or provides opportunities for its nurturance, one does not simply wait for it. Readiness, in these terms, comprises mastery of those simpler skills that permit one to reach higher skills."

Of course, it remains to discover those simpler skills on which performance at higher levels in any particular task depends (that is, the hierarchies of competence) and to discover the means by which the various prerequisite competencies may be imparted. A beginning has been made in analyzing hierarchies in mathematics (Gagne et al., 1962) and reformulating the principles of learning so as to make explicit the conditions upon which the acquisition of competence at the various levels depends (Gagne, 1965). Out of these new developments has grown the "process approach" to science instruction (Gagne, 1966).

A beginning in identifying fundamental skills underlying literacy may have been made by Gillooly and Murray (1967) who found that merely familiarizing middle-class 4th, 5th, and 6th grade children with initially unfamiliar terms (paralogs) that were embedded in a reading paragraph not only enhanced their reading comprehension, as measured by both a recall test and a recognition test, but also their ability to spell the familiarized terms correctly. In other words, a familiarization training procedure which amounted to six trials of pronouncing the terms three times per trial as well as writing them once per trial produced quite general facilitative effects.

These findings suggest needed research on learning disabilities in the socially disadvantaged. There is a

large corpus of research which indicates that the language of these groups differs markedly from that of their more advantaged classmates, especially in school-relevant ways (Figurel, 1964; Frazier, 1964). Therefore, for these groups, large portions of the language of the majority social class and, hence, the language of instruction, may be unfamiliar. We do not yet know the extent to which classroom learning may suffer because of this unfamiliarity. But a beginning should be made in exploring the problem.

This initial attempt proposes to begin by assessing the effects of unfamiliarity with school-relevant language on verbal intelligence test performance. Our specific hypothesis is that performance on a subtest of the California Short-Form Test of Mental Maturity (CSFTMM) will be enhanced by familiarization training.

This seems a fruitful place to begin since Vernon (1965) has already identified the failure to acquire the language which is the medium of instruction as a potential source of difficulty in intellective functioning. Further, research by Deutsch et al. (1964), as reported by Raph (1965), indicates the need for improving language skills if one is to raise the IQ scores of the disadvantaged.

Before presenting the specific methods used in this study to investigate this hypothesis, we should review in somewhat more detail the familiarization research which influenced the choice of methods employed. In doing so, we will discuss the extent of familiarization's effects first and then the factors upon which those effects depend.

The Effects of Familiarization

Beginning in 1965, research into familiarization first showed that it could, under certain circumstances, produce a reduction in students' associative latency (AL) measured from the time each student (S) was presented a stimulus item to the beginning of his response (Gillooly, 1965). Further research showed that familiarization also enhanced the serial learning of novel verbal items (CVC trigrams) (Gillooly, 1966, 1967) as well as Ss' reading comprehension in situations involving English prose and paralogs (two-syllable non-words) (Gillooly & Murray, 1967; Murray & Gillooly, 1967). Finally, Gillooly and Furukawa (1968) showed that familiarizing Ss on Hawaiian words that were novel to them and which were embedded in a programmed lesson enhanced their learning.

Factors Affecting Familiarization's Effects

Instructions

Quite early in the research on familiarization it was found that the instructions under which Ss operate during familiarization training are very important. Significant facilitative effects have been found, so far, only with instructions to pronounce the relevant materials. Spelling instructions not only do not produce facilitative effects (Riley & Phillips, 1959; Gillooly, 1965, 1966, 1967) but may, under some circumstances, produce decremental effects (Noble, 1963).

Number of Familiarization Trials

It has been shown that not only the judged familiarity of verbal items but also the facility with which they are learned is an increasing, negatively accelerated function (Noble, 1954, 1955). The function is such that each of the first five or six familiarization trials adds markedly to either effect.

It follows from such a finding, of course, that in order to show significant familiarization training effects, verbal materials must have been experienced by the S few times, if at all, in the past (i.e., the verbal materials must be pre-experimentally unfamiliar) and the S must experience the materials a certain minimum number of times in the experiment.

Previous research into this effect in classroom situations has utilized six familiarization trials (Gillooly & Murray, 1967; Murray & Gillooly, 1967; Gillooly & Furukawa, 1968).

Response Mode

In general, although familiarization has been shown to produce statistically significant effects on both constructed response (CR) and multiple-choice (MC) tests, the effects are not so great on an MC as on a CR test (Gillooly & Murray, 1967; Gillooly & Furukawa, 1968).

Subjects

So far, familiarization effects in the classroom have been found with 4th, 5th, and 6th grade middle-class children (Gillooly & Murray, 1967) and college students (Murray & Gillooly, 1967; Gillooly & Furukawa, 1968).

METHOD

Experimental Design

The design of the study was of a 2 x 2 x 3 completely-crossed factorial type with treatments (Relevant and Irrelevant Familiarization), sex (male or female), and grade level (4th, 5th, and 6th) as the experimental factors. Relevant Familiarization (RF) consisted of four trials of silently pronouncing (three times per trial) and writing (once per trial) twenty words taken from Subtest 7 of the California Short-Form Test of Mental Maturity (CSFTMM) which were presumed to be initially unfamiliar to the Ss. Irrelevant Familiarization (IF) consisted of four trials of silently pronouncing (three times per trial) and writing (once per trial) twenty prepositions, articles, etc., found in Subtest 7 of the CSFTMM which were presumed to be initially familiar to the Ss. Overall, each word (Relevant or Irrelevant) was to be written four times and pronounced twelve times during familiarization training.

The dependent variables of the study consisted of two tests: Subtest 7 of the CSFTMM and a spelling test, both of which are described below (Materials).

Subjects

Two hundred eighty-eight students drawn from grades 4, 5, and 6 in two Baltimore, Maryland, inner-city schools participated in the study. School A is located in a low socioeconomic community wherein a variety of small businesses are situated. School records indicated that many of the participants' parents were employed as domestic workers, waitresses, and part-time workers. Unemployment appeared to be common and, therefore, sizable numbers of families subsisted on public welfare. The racial pattern of the community at the time of this study was approximately 50% non-white, the majority of these being black Americans. School B, though situated some distance from School A, drew its students from a community quite similar, in terms of its structure and the socioeconomic level of its inhabitants, to the former's. In this community, however, black Americans constitute approximately 90% of the residents. The racial composition of the student body in each school was consistent with its respective neighborhood.

There were no appreciable differences between the pupils in Schools A and B in terms of their age within each grade level and their intelligence quotient scores. School records also disclosed that reading problems

existed in each school. For grades 4, 5, and 6, the average reading grade level for both schools was approximately one year below grade placement level. Intra-grade variability in reading ability was substantial.

The students were assigned randomly within sex and classrooms to either the RF or IF treatment condition. Accordingly, there were 144 RF and 144 IF Ss (48 fourth, 61 fifth, and 35 sixth graders in each condition). Table 1 details the distribution of Ss by sex, grade level, and treatment condition.

TABLE 1

THE NUMBER OF STUDENTS ASSIGNED TO EACH TREATMENT

Treatment	Relevant Familiarization			Irrelevant Familiarization		
Grade Level	4	5	6	4	5	6
Sex						
Male	21	27	15	21	27	15
Female	27	34	20	27	34	20
TOTALS	48	61	35/144	48	61	35/144

Materials

The experimental materials consisted of Subtests 5 (Number Problems), 6 (Verbal Comprehension), and 7 (Recall) of the California Short-Form Test of Mental Maturity (CSFTMM) (Monterey, California: California Test Bureau, 1963), Form S, Level 2 (Elementary), and a four-page experimental packet which is reproduced in Appendix A of this report.

Subtests 5 and 6 of the CSFTMM served to adapt the Ss to the testing situation. Subtest 7 consists of twenty-five multiple-choice questions designed to test the Ss' recall of facts from a short story, "The Life of a Fawn." The story, although read to the children at the beginning of a testing period during a standard test administration (thereby constituting a delayed listening comprehension test), was reproduced on pages 2 and 3 of the experimental packet so as to permit the Ss to read it for themselves in

this experiment (thereby serving the purposes of a reading comprehension test here).

The first page of the experimental packet, a familiarization sheet, consisted of four columns (hence, four familiarization trials), each containing the same twenty words arranged with a line beside every word. The Ss were instructed to "pronounce each word three times as you write in the space [i.e., on the line] at the right." As a consequence, each word was to be written four times and pronounced twelve times by each S. Four familiarization trials were selected so as to stay well within the attention span of these youngsters.

The Relevant Familiarization (RF) condition employed words presumed to be initially unfamiliar to the Ss. These words were: tender, fawn, steadily, dusk, retreated, depths, slopes, gradually, adventurous, wandered, investigating, sensitive, crouched, disappeared, scampered, strayed, pawed, tinkle, cautiously, bales.

The Irrelevant Familiarization (IF) condition employed more common words such as prepositions, articles, etc., also taken from the short story but which, because of their frequency of occurrence in English prose, were presumed to be initially familiar to the Ss. These words were: not, a, was, in, the, of, with, and, only, were, he, his, they, into, up, on, which, for, this, be.

The second and third pages of the experimental packet contained the 433-word story, "The Life of a Fawn," which was taken from the CSFTMM as noted above. The last page of the packet was a spelling test. In this test, each of the twenty RF words was presented along with four incorrectly-spelled distractors. The Ss were instructed to "circle the word from the story that is spelled correctly."

All experimental packets were identical except for the first sheet which comprised either the RF or IF condition. The RF and IF packets were distributed randomly within sex and classroom.

Procedure

So as to make the experimental conditions as similar as possible to the usual classroom environment, student teachers who had been working with the regular classroom teachers for several months administered Subtests 5, 6, and 7 of the CSFTMM as well as the experimental treatment to the students. Familiarity with the nature of the study and the proper way of administering the tests were obtained in several meetings with one of the investigators. The Ss,

in addition, were shown how to respond through demonstrations prior to testing. Testing was undertaken near the end of the school year and the Ss were not informed that an experiment was being conducted.

Subtest 5 (Number Problems) and Subtest 6 (Verbal Comprehension) were administered according to standard procedures. Upon completion of the two subtests, the Ss were instructed to perform the familiarization task found on the first page of their experimental packet. No time limit was imposed for this task. After most of the Ss had completed at least three-quarters of the items, they were instructed to turn to the short story on pages 2 and 3 of their booklets. Four minutes were allowed for reading the story. Subtest 7, twenty-five multiple-choice questions, was administered from the CSFTMM after the termination of the reading period. Finally, the spelling test was administered (page 4 of the experimental packet).

So as to insure reliability of scoring, the student teachers checked each other's work and a final check was made by one of the Experimenters.

RESULTS

After the reliability of the data from Subtest 7 of the CSFTMM was determined, the data from both Subtest 7 and the spelling test were subjected to an analysis of variance (ANOVA).

Subtest 7

When the reliability of the scores from the split halves (odd/even) of Subtest 7 was calculated by means of the Pearson product-moment correlation coefficient, an $r = .773$ ($p < .001$) was obtained. The reliability coefficient, corrected by means of the Spearman-Brown formula, was equal to .872.

The results of ANOVA performed on the data from Subtest 7, summarized in Table 2, show that Grade Level is the only significant main effect ($F = 33.76$; which, for $df = 2/276$, $p < .001$). The effect of Relevant Familiarization, though in the expected direction (RF = 11.93 correct answers, IF = 11.60 correct answers), was not statistically significant ($F < 1.00$).

TABLE 2

VARIANCE TABLE FOR DATA COLLECTED ON SUBTEST 7 OF THE CALIFORNIA SHORT-FORM TEST OF MENTAL MATURITY

Source	df	Sums of squares	Mean squares	F	p
Familiarization	1	7.73	7.73	< 1.00	N.S.
Sex	1	13.97	13.97	< 1.00	N.S.
Grade Level	2	1,627.97	813.98	33.76	< .001
Famil. x Sex	1	14.66	14.66	< 1.00	N.S.
Famil. x Grade	2	10.08	5.04	< 1.00	N.S.
Sex x Grade	2	137.78	68.89	2.85	.10 > p > .05
Famil. x Sex x Grade	2	21.97	10.98	< 1.00	N.S.
Within	276	6,656.86	24.11		
TOTAL	287	8,491.02			

The Sex by Grade Level interaction reached a borderline level of significance ($F = 2.85$; which, for $df = 2/276$, $.10 > p > .05$). A plot of the data (Appendix B) reveals that the near-significant interaction is disordinal and resulted from the fact that the superiority usually enjoyed by girls on reading comprehension-type tests, although manifested in grades 4 and 5 of this study, was not found in grade 6. In grade 6, boys were the better performers on Subtest 7. The finding is of no consequence to the main interest of this study, however.

Table 3 presents the mean scores on Subtest 7 for each experimental subgroup in the study.

Spelling Test

The results of ANOVA performed on the data from the spelling test, summarized in Table 4, show the RF group's performance (14.02 words spelled correctly) exceeded the IF group's (10.88 words correctly spelled) to a significant degree ($F = 15.38$; which, for $df = 1/276$, $p < .001$). In addition, the Grade Level main effect was significant ($F = 13.88$; which, for $df = 2/276$, $p < .001$).

TABLE 3

MEAN SCORES (NUMBER OF ITEMS CORRECT OUT OF 25 QUESTIONS) ON SUBTEST 7 OF THE CALIFORNIA SHORT-FORM TEST OF MENTAL MATURITY FOR EACH EXPERIMENTAL SUBGROUP

Treatment	Relevant Familiarization			Irrelevant Familiarization		
Grade Level	4	5	6	4	5	6
Sex						
Male	9.71	10.52	17.60	8.95	9.90	16.26
Female	10.19	11.97	14.20	9.62	11.32	15.75
TOTALS	9.98	11.32	15.66	9.33	10.88	15.97

TABLE 4

VARIANCE TABLE FOR DATA COLLECTED WITH THE SPELLING TEST

Source	df	Sums of squares	Mean squares	F	p
Familiarization	1	711.74	711.74	15.38	< .001
Sex	1	52.80	52.80	1.14	N.S.
Grade Level	2	1,285.11	642.55	13.88	< .001
Famil. x Sex	1	2.62	2.62	< 1.00	N.S.
Famil. x Grade	2	230.19	115.09	2.49	.10 > p > .05
Sex x Grade	2	14.29	7.14	< 1.00	N.S.
Famil. x Sex x Grade	2	71.32	35.66	< 1.00	N.S.
Within	276	12,769.18	46.26		
TOTAL	287	15,137.25			

The Treatment by Grade Level interaction reached a borderline level of significance ($F = 2.49$; which, for $df = 2/276$, $.10 > p > .05$). A plot of the data (Appendix C) shows the interaction to be ordinal with RF's effect, although consistently facilitating, greatest at the 5th grade level (where the difference in spelling scores = 4.76 words in favor of the RF condition), smallest at the 4th grade level (difference = .69 words in favor of RF), and intermediate at the 6th grade level (3.72 words in favor of RF).

Table 5 presents the mean scores on the spelling test for each experimental subgroup.

TABLE 5

MEAN SCORES (NUMBER OF WORDS OUT OF 20 SPELLED CORRECTLY) ON SPELLING TEST BY EXPERIMENTAL SUBGROUP

Treatment	Relevant Familiarization			Irrelevant Familiarization		
Grade Level	4	5	6	4	5	6
Sex						
Male	11.00	14.30	16.20	8.63	9.66	13.73
Female	9.66	15.70	18.25	10.29	10.85	13.60
TOTALS	10.25	15.08	17.37	9.56	10.32	13.65

CONCLUSIONS AND DISCUSSION

The hypothesis we began with, namely, that the effects of familiarization would be the enhancement of performance on Subtest 7 of the California Short-Form Test of Mental Maturity (CSFTMM) presented visually, that is, as a reading comprehension test, was not supported by the data in this study and it is necessary now to try and determine why.

First of all, it must be recognized that the hypothesis may be wrong and that familiarization, although it enhances spelling performance, does nothing more than that. Before accepting this conclusion, however, perhaps we should review the procedures used in this study so as to ascertain whether the experimental arrangements permitted a masking of familiarization's possibly beneficial effects.

Crucial to the test of the hypothesis, of course, was that the RF groups undergo familiarization training. To that end, it was decided that Ss should work at the familiarization task until "most had completed 3/4 of the items" (three familiarization trials) and the student teachers serving as testers were so instructed. A post hoc analysis revealed that those instructions were followed. Of 288 Ss, 209 or 73% finished familiarization training. However, further perusal showed that the proportion of Ss finishing the familiarization task was not equal in the two experimental subgroups. Whereas 98% of the IF group finished their treatment, only 44% of the RF group did so. A chi-square (χ^2) analysis shows the discrepancy to be statistically significant ($\chi^2 = 104$; which, for df = 1, $p < .001$).

Further inspection revealed that the likelihood of a student finishing RF was related to his grade level. Although 64% of the 6th graders finished, only 28% of the 4th graders and 44% of the fifth graders managed to do so. The apparent reason for the unequal proportions finishing familiarization treatment was the unequal lengths of the RF and IF words. The RF words were on the average 7.7 graphemes long but the IF words contained an average of only 3.0 graphemes.

The reason for the unequal word lengths, in turn, was due to the so-called Zipf effect (1945) which refers to the fact that word length and frequency of occurrence are inversely related--the most frequently used words are the shortest. In other words, the length of a word is confounded with its frequency of occurrence (or its familiarity). So, when the Experimenters chose familiar (i.e., frequently experienced) words as a control condition, they necessarily selected shorter words.

The important question which remains is whether the failure of the experimental subgroups to undergo the complete RF treatment can be a plausible explanation of Relevant Familiarization's lack of efficacy on the CSFTMM here. In order to be so, it is necessary, at a minimum, to show that where significant RF effects were obtained, as on the spelling test, increasing amounts of RF training were associated with increased effects. In this regard, it should be noted that the interaction between treatment and grade level (or number of RF trials) did reach a borderline level of significance on the spelling test and that the data plot shows the interaction to result from the small RF/IF differences obtained at the 4th grade level and the much larger differences at the 5th and 6th grade levels. This is as expected given the fact that greater proportions of 5th and 6th graders than 4th graders finished RF training. The one deviation from expectancy, the fact that the RF/IF difference at the 5th grade exceeds that found at the

6th grade, may be due to the ceiling effect which would operate to suppress the 6th grade RF group's performance (an average of 17.37 words spelled correctly) as they approached the test's maximum score of twenty.

It is, consequently, the conclusion of these Experimenters that because the children in the experimental condition did not receive the prescribed training, the null findings of this study, rather than disconfirming the hypothesis that Relevant Familiarization training may help these youngsters' reading and intelligence test performance, are inapplicable to it.

This problem may be avoided in future studies by either (1) using more control (irrelevant) than experimental words, (2) using an equal number of control words chosen from a source other than the experimental story and which are equally as long as the experimental words, or (3) by using paralogs (two-syllable non-words).

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APPENDIX A

SAMPLE EXPERIMENTAL PACKET
(RELEVANT FAMILIARIZATION CONDITION)

Baltimore City Public Schools
Baltimore, Maryland 21218

PRONOUNCE EACH WORD THREE TIMES AS YOU WRITE IN THE SPACE AT THE RIGHT

tender_____	tender_____	tender_____	tender_____
fawn_____	fawn_____	fawn_____	fawn_____
steadily_____	steadily_____	steadily_____	steadily_____
dusk_____	dusk_____	dusk_____	dusk_____
retreated_____	retreated_____	retreated_____	retreated_____
depths_____	depths_____	depths_____	depths_____
slopes_____	slopes_____	slopes_____	slopes_____
gradually_____	gradually_____	gradually_____	gradually_____
adventurous_____	adventurous_____	adventurous_____	adventurous_____
wandered_____	wandered_____	wandered_____	wandered_____
investigating_____	investigating_____	investigating_____	investigating_____
sensitive_____	sensitive_____	sensitive_____	sensitive_____
crouched_____	crouched_____	crouched_____	crouched_____
disappeared_____	disappeared_____	disappeared_____	disappeared_____
scampered_____	scampered_____	scampered_____	scampered_____
strayed_____	strayed_____	strayed_____	strayed_____
pawed_____	pawed_____	pawed_____	pawed_____
tinkle_____	tinkle_____	tinkle_____	tinkle_____
cautiously_____	cautiously_____	cautiously_____	cautiously_____
bales_____	bales_____	bales_____	bales_____

DO NOT GO ON TO NEXT PAGE UNTIL TOLD TO DO SO

Baltimore City Public Schools
Baltimore, Maryland 21218

THE LIFE OF A FAWN*

One spring, not long ago, a baby deer was born in the foothills of the White Mountains, near the shore of Lake Bountiful. It was a good spring, with only small patches of unmelted snow still left in the shady places. In the meadows the grass was already green and sweet, and the trees were covered with tender young buds.

The fawn grew swiftly and steadily. In the grey light of early morning and the dusk of evening, he and his mother would feed on the grass in the meadows. During the heat of the day they usually retreated into the depths of the forest. Sometimes during the first few hours after sunrise they would climb up the mountain and eat the berries which grew on the sunny slopes.

For the first three months the fawn stayed close to his mother, but gradually be became more adventurous. This sometimes led him into trouble. One morning while they were on the mountainside he wandered far away, busily investigating each new bush, log, or stick. Suddenly his sensitive nose discovered a strange odor, one he had smelled before, but never so close by. Then he saw where the odor came from. There, crouched on a fallen tree trunk only

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fifty yards away, was a great mountain lion. The fawn stood motionless. At last the lion rose lazily to his feet, leaped off the fallen tree, and disappeared. The fawn scampered hastily back to his mother. It would be a long time before he strayed again.

Summer passed away and fall came, with its bright leaves, brown grass, and its juicy acorns for the deer to eat. The fawn had lost some of his spots and was on his way to becoming a buck. After fall came winter. The snow fell and the trees lost their leaves. It was a hard time for both mother and fawn, as there was very little to eat. At first, they pawed away the snow and ate the sour, dead grass. Finally the snow became too deep to find any grass at all. One day, just as things seemed hopeless, they heard the cheery tinkle of bells. Moving cautiously toward the sound, they saw the forest ranger with his horse-drawn sled. On the sled were many bales of hay. Every mile the ranger dumped one bale off the sled so that all the deer would have winter food.

All was well now for the fawn. The spring was only four months away, and when the snow finally melted he would no longer be a fawn, but a young buck.

Baltimore City Public Schools
Baltimore, Maryland 21218

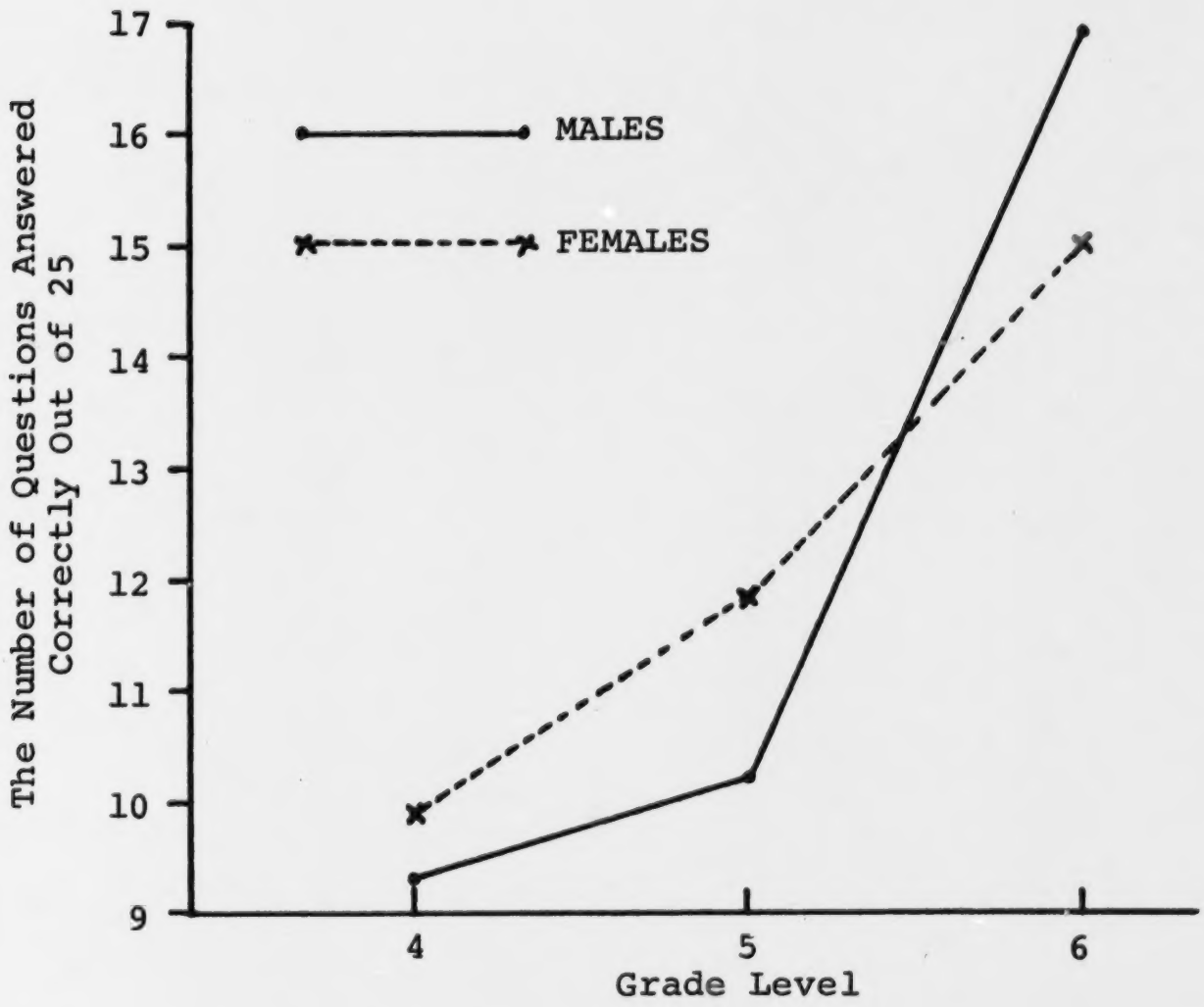
INSTRUCTIONS: CIRCLE THE WORD FROM THE STORY THAT IS SPELLED CORRECTLY

EXAMPLE: muose (mouse) mose moues

1.	tender	tinder	tendir	tendere	tenner
2.	faun	fawn	fane	fown	foun
3.	steadily	stadily	steedily	steadiley	steadly
4.	dask	dosk	duss	dusk	dest
5.	retreeded	retreated	retaeted	ritreted	retrieted
6.	depes	dephs	deaphs	detphs	depths
7.	sloopes	sloppes	slops	slopes	slopess
8.	gradully	gradually	gradally	gradualy	gratually
9.	abventuous	adventurous	adventuous	adventurus	adventuras
10.	wanered	wandered	wanderd	wannered	wondered
11.	envistegating	investegating	invistigating	investigating	envestigating
12.	sensitive	sincitive	sencitive	sensetive	sinsetive
13.	croched	crouched	croughed	crowched	crouhed
14.	disappeared	desapeared	disapeared	desappeared	dissapeared
15.	skampered	scammered	scappered	scampered	scamppered
16.	straed	srayed	strayed	srayd	strayde
17.	powed	pawd	pauw	puwed	pawed
18.	tikle	tenkle	tinkle	tinnkle	tinkel
19.	coutiously	causiously	kautiously	cautiosly	cautiously
20.	balles	bales	bayles	bailes	belles

APPENDIX B

DATA PLOT OF THE INTERACTION OF SEX WITH GRADE LEVEL ON SUBTEST 7 OF THE CALIFORNIA SHORT-FORM TEST OF MENTAL MATURITY



APPENDIX C

DATA PLOT OF THE INTERACTION OF FAMILIARIZATION
WITH GRADE LEVEL ON THE SPELLING TEST